PATENT SPECIFICATION

DRAWINGS ATTACHED

1,150,382

1,150,382

Date of Application and filing Complete Specification: 3 May, 1966.
No. 19389/66.
Application made in France (No. 17298) on 17 May, 1965.
Complete Specification Published: 30 April, 1969.

Index at acceptance: —F2 H41B; B3 N(2A, 2B, 7A, 7B)
Int. Cl: —F 16 b 23/00

COMPLETE SPECIFICATION

Improvements in Screws, and a Screw Driver therefor

PATENTS ACT, 1949

SPECIFICATION NO. 1,150,382

The following amendments were allowed under Section 29 on 17th October 1969

Page 1, lines 47 and 50, page 3, lines 67 and 71, *after* "three" *insert* "side"

Page 1, lines 79 and 84, page 3, lines 118 and 122, *after* "three" *insert* "curved side"

Page 4, lines 8 and 11, *for* "drawing" *read* "drawings"

THE PATENT OFFICE,
8th December 1960

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in spite of such disadvantages.

In the cruciform and single slotted conical screwheads, the screw-driver tends to slide out of the aperture, that is to say, towards the surface of the head, where the diameter of the aperture is greatest.

In the act of screwing or unscrewing a wood or metal screw, with cruciform screwhead, the shaft of the screwdriver, under the manual impetus, makes irregular movements, inclining in all directions and even describing a circle or an ellipse. The result is a breaking of contact of the periphery of the aperture and the end of the tool and finally a disengagement of the screw-driver, which lies only partially in the groove. This necessitates the frequent readjustment and for re-insertion of the screwdriver into the screwhead slot, with resulting loss of time and wear of the tool and of the aperture, the latter tending to substantially diminish the life of the screwhead.

Accordingly, it is an object of this invention to overcome these defects of conventional screws and screw-drivers.

The invention consists in a screw having a

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the screw-driver and a second portion including at least three side surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw-driver from the first portion further along the shaft, the transverse cross-section of the second portion being larger than the transverse cross-section of the first portion.

Preferably, each of the closed figures formed in transverse cross-section has four concave sides.

Preferably, the corners joining adjacent sides of the closed figures are blunted.

The invention further consists in a screw having a socket for receiving a screw-driver, comprising a recess including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw and a screw-driver having a shaft with a portion including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw-driver so that upon insertion of the screw-driver into the socket an interference fit (as

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COMPLETE SPECIFICATION

Improvements in Screws, and a Screw Driver therefor

I, ROMAIN PODOLSKY, of 6 rue Basly, Asnieres, France, of French nationality, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in wood and metal screws and screw-drivers therefor.

Wood and metal screws as at present generally in use are formed either with single slot or cruciform slotted screwheads. These two kinds of screw have many disadvantages.

To appreciate the true value of the features of the invention, it is necessary briefly to enumerate the disadvantages inherent in cruciform slotted screws and their screw-drivers, but which are universally known and employed in spite of such disadvantages.

In the cruciform and single slotted conical screwheads, the screw-driver tends to slide out of the aperture, that is to say, towards the surface of the head, where the diameter of the aperture is greatest.

In the act of screwing or unscrewing a wood or metal screw, with cruciform screwhead, the shaft of the screwdriver, under the manual impetus, makes irregular movements, inclining in all directions and even describing a circle or an ellipse. The result is a breaking of contact of the periphery of the aperture and the end of the tool and finally a disengagement of the screw-driver, which lies only partially in the groove. This necessitates the frequent re-adjustment and for re-insertion of the screw-driver into the screwhead slot, with resulting loss of time and wear of the tool and of the aperture, the latter tending to substantially diminish the life of the screwhead.

Accordingly, it is an object of this invention to overcome these defects of conventional screws and screw-drivers.

The invention consists in a screw having a socket for receiving the shaft of a screw-driver, comprising a first recess including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw, and a second recess including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw from the first recess further into the screw, the transverse cross-section of the second recess being smaller than the transverse cross-section of the first recess.

The invention further consists in a screw-driver having a shaft for insertion into the socket of a screw, comprising a first portion including at least three side surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw-driver and a second portion including at least three side surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw-driver from the first portion further along the shaft, the transverse cross-section of the second portion being larger than the transverse cross-section of the first portion.

Preferably, each of the closed figures formed in transverse cross-section has four concave sides.

Preferably, the corners joining adjacent sides of the closed figures are blunted.

The invention further consists in a screw having a socket for receiving a screw-driver, comprising a recess including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw and a screw-driver having a shaft with a portion including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw-driver so that upon insertion of the screw-driver into the socket an interference fit (as

hereinafter defined) is effected therebetween.

In this specification the expression "interference fit" means that when the screw-driver is inserted into the socket and the screw is held with the screw-driver depending vertically therefrom, the screw and the screw-driver remain in engagement.

The effort of screwing and unscrewing manually, by the means of the present invention, is very slight and does not require one to press on the top of the shaft or holder of the screw-driver. This is also true in the case of screwing or unscrewing by means of a manual, electrical or pneumatic drill. The result is that, in the present case, the maintenance of the screw on the tool and in axial alignment therewith undoubtedly facilitates the insertion of the screw.

The arrangements referred to hereafter, show a simple, practical and proven means for assuring the alignment of the screw and screw-driver, and permitting rapid screwing and unscrewing without loss of time, whether by hand as by breast drill, or even by machines.

In the drawings,

Fig. 1 is a perspective view of a metal screw having a socket formed in accordance with the invention;

Fig. 2 is a longitudinal cross sectional view of the screw in Fig. 1;

Fig. 3 is a transverse cross sectional view of the screw of Fig. 1 along the line a—a in Fig. 2;

Fig. 4 is a top plan view of one recess in the socket of a screw with the corners blunted;

Fig. 5 is a top plan view of one recess in the socket of a screw having four concave sides;

Fig. 6 is a top plan view of the screw as shown in Fig. 1;

Fig. 7 is a top plan view of the screw in accordance with this invention wherein the recess at the bottom of the socket, is rotated 45° from that in Fig. 6;

Fig. 8 is a side elevational view of a screw-driver showing the cross sectional view of the screw as in Fig. 2 in phantom lines;

Fig. 9 is a partial cross sectional view of a screw wherein the screw head has a conical face;

Fig. 10 is a partial cross sectional view of a screw wherein the screwhead is hemispherical;

Fig. 11 is a partial cross sectional view of a screw wherein the screwhead is cylindrical;

Fig. 12 shows a screw and a screw-driver wherein the screw is being held vertically to illustrate that the interference fit between screw and screw-driver for resisting separation of the screw-driver from the screw;

Fig. 13 is a perspective view of a wood screw; and

Fig. 14 shows a top plan view of a screw according to an alternative embodiment with a recess having three concave sides.

It must be considered in the present case that the socket formed in the head of the screw is provided with a number of interior faces, all parallel to the longitudinal axis of the screw.

Referring to Figures 1, 2 and 3 the screw includes a socket having an inner recess "t", adjacent the bottom "p" of the socket. The recess "t" is defined by four concave curved sides as shown in Figs. 3 and 6. An enlarged portion "e" of the socket, adjacent the top of the socket is separated from the recess "t" by a radial shoulder. The enlarged portion "e" is defined by four concave curved sides as shown in Fig. 6.

Referring to Fig. 8 a screw-driver has a projection "T" having four incurved faces that are parallel to the longitudinal axis of the screw-driver. The projection "T" terminates in a conical point "P" at the end of the screw-driver adjacent the projection "T" the screw-driver has a shank portion "E" of a cross sectional width that is greater than that of the projection "T". The shank portion "E" has four incurved faces that correspond in size and shape to the incurved faces in the enlarged portion "e" of the screw socket. The projection "T" also has four incurved faces that correspond in size and shape to the incurved faces in the recess "t". The projection "T" is connected to the shank "E" by a small radius fillets to avoid cracking and breaking off the projection "T". The arrangement of the shank "E", the projection "T" and the point "P" is thus sharply defined.

The shoulder or shoulders "E" and the projection "T" (Figure 8) have parallel to the axis of the screw and not conically tapered as is the case of cruciform grooved screws.

The portion of the screw-driver receivable in a complimentary screw is virtually the same size and shape as the socket in the screw.

In order to appreciate the basic idea of the invention, it is sufficient to note that the screw is turned clockwise or anti-clockwise according to whether screwing or unscrewing is being effected or the type of screw thread employed, by inserting only a part of the propjection of the screwdriver into the aperture "t".

The latter is, however, very helpful in obtaining a proper connection between the screw and the screw-driver in order to maintain the screw along the longitudinal axis of the screw-driver shaft and to prevent any "play" between the two members.

The point or end of the screw-driver projection assists the orientation and penetration in the workpiece, the point at the end of the screw-driver serves to facilitate the orientation of the penetration in the aperture in the head, and contributes to the maintenance of the

longitudinal axis of the screw as an exact extension of that of the screw-driver.

The shape of the recesses in the socket in longitudinal section decreases in stages to the bottom thereof and is also advantageous. Similarly the screw-drivers conform in shape and in transverse section to the socket in the head of the screw. In contradistinction thereto, the cruciform screw is characterised by its conical aperture; this conical shape is responsible for the disadvantages mentioned above; the parallel extending sides of the socket entirely obviates these disadvantages.

The shaft of the screw-driver, shown in Figure 12, has a transverse section with four concave curved sides (Figures 4 and 5). This shaft may, however, have various cross-sections for example, square, hexagon.

The transverse section of the screw-driver having concave curved sides in transverse cross section conforms exactly to the socket in the head, into which the shaft penetrates, to form the shoulder "E". If the shoulder joins the body of the shaft with a slight rounding, cracking in the screw-driver is prevented at this point of stress concentration.

With the present invention, it must be emphasised that the portion of the stem constituted by the shank "E" penetrates to a certain depth, into the top of the socket (Figure 8). This is very important in order to maintain the longitudinal axis of the screw-driver in alignment with that of the screw.

Also, as regards the screw, an annular washer of thin steel, or of nylon, may be arranged beneath the head.

It should be noted that it is very difficult to insert into position a cruciform grooved screw which is in an awkward position, on the other hand, such a procedure is simple, with a screw (Figure 12) of the present invention, due to the interference fit between the screw and screw-driver.

This is demonstrated in the following manner (Figure 12):

The screw, held by the screw-driver, is held between the thumb and index finger, and the screw-driver with its point held vertically, remains in engagement with the screw. This feature is of great advantage to the user in view of the fact that it has not previously been possible to manipulate either the cruciform grooved screw or the screw with single slotted head in such a way.

The shaft of the tool may be made of tempered steel, preferably nickel-chrome or vanadium.

The end of the said tool is tempered in order that the projection and shoulder shall be of sufficient hardness, whilst giving to the steel the necessary ductility and resistant to torsion, during screwing and unscrewing.

WHAT I CLAIM IS:—

1. A screw having a socket for receiving the shaft of a screw-driver, comprising a first recess including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw, and a second recess including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw from the first recess further into the screw, the transverse cross-section of the second recess being smaller than the transverse cross-section of the first recess.

2. A screw as claimed in claim 1, wherein the recesses have geometrically similar transverse cross-sections.

3. A screw as claimed in claims 1 and 2 wherein a shoulder is formed between the first and second recess.

4. A screw-driver having a shaft for insertion into the socket of a screw, comprising a first portion including at least three side surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw-driver and a second portion including at least three side surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw-driver from the first portion further along the shaft, the transverse cross-section of the second portion being larger than the transverse cross-section of the first portion.

5. A screw-driver as claimed in claim 4, wherein a shoulder is formed between the first and second portions.

6. A screw-driver as claimed in claim 4 or 5 wherein the portions have geometrically similar transverse cross-sections.

7. A screw as claimed in claims 1 to 3 or a screw-driver as claimed in claims 4 to 6, wherein each of the closed figures formed in transverse cross-section has four concave sides.

8. A screw as claimed in claim 1 or a screw-driver as claimed in claim 4 wherein at least one of the closed figures formed in transverse cross-section has three concave sides.

9. A screw as claimed in claims 1 to 3, 7 or a screw-driver as claimed in claims 4 to 6 and 7, wherein corners joining adjacent sides of the closed figures are blunted.

10. A screw having a socket for receiving a screw-driver, comprising a recess including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw and a screw-driver having a shaft with a portion including at least three surfaces forming a closed figure in transverse cross-section and extending parallel to the longitudinal axis of the screw-driver so that upon insertion of the screw-driver into the socket an interference fit (as hereinbefore defined) is effected therebetween.

11. A screw and a screw-driver as claimed in claim 10 wherein the socket includes a

pair of the said recesses and the shaft on the screw-driver includes a pair of portions.

12. A screw substantially as herein described with reference to the accompanying drawings.

13. A screw-driver substantially as herein described with reference to the accompanying drawing.

14. A screw and a screw-driver substantially as hereinbefore described with reference to the accompanying drawing.

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Chartered Patent Agents.

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1150382 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

FIG.1

FIG.2

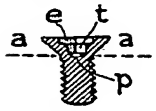

FIG.3

FIG.4

FIG.5

FIG.6

FIG.7

FIG.8

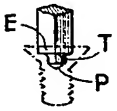

FIG.9

FIG.10

FIG.11

FIG.12

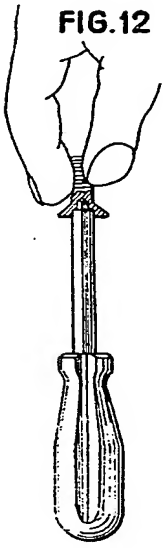

FIG.13

FIG.14